about ⅛ inch above the lip of the tube. The water level in the tube is then varied so that the meniscus contacts the sample, after which the pressure used to raise the meniscus (about 2 psi) is reduced to zero. The weight of the sample sheet is monitored as water is taken up by the sample. Time zero is set at the instant when the sample first takes up water (first change in balance reading from dry weight). At time equals two seconds (two seconds after time zero), the contact between the meniscus and the sample sheet is broken by suction (about 2 psi) applied to the water in the tube, and the wetted sample weight is recorded. The wetted sample is weighed after breaking contact between the meniscus and the sample so as not to include surface tension in the weight measurement.

The absorbent rate is the weight of the wetted sample minus the sample dry weight, divided by 2 seconds. A small positive pressure (about 2 psi) is applied to the water in the tube to cause the meniscus to recontact the sample. The weight of the sample is again monitored until time equals 180 seconds. At time equals 180 seconds, the contact between the meniscus and the sample sheet is broken by suction (about 2 psi) applied to the water in the tube, and the wetted sample weight is again recorded. The wetted sample is weighed after breaking contact between the meniscus and the sample so as not to include surface tension in the weight measurement. The wicking capacity is calculated as the wetted sample weight at 180 seconds minus the dry weight, divided by the dry weight. The absorbent capacity and wicking capacity are each reported as an average of at least 4 measurements.

Texture Value

The texture value is a measurement of the non-embossed, wet formed texture of a surface of a tissue paper web. Each surface of a ply can be measured and assigned a texture value. Generally, if only one texture value is provided, it is the higher texture value for the two surfaces of a ply. Mechanically embossed texture, such as that imparted to the plies when the plies are combined, is not measured The texture value of a surface is determined by scanning a surface of a ply with a transmitted light microscope, and determining the elevation difference between a local high point (peak) and an adjacent local low point (valley) in a particular field of view. The texture value of the surface of a ply is preferably measured prior to combining a ply with other plies to form a multiple ply product. However, the texture value can also be obtained from a sample cut from a multiple ply sample, provided that any texture features created by combining the plies (e.g. embossing) are not included in the measurement.

The elevation difference is determined by varying the focus of the microscope, and recording the difference in focus positions between the peaks and adjacent valleys in the field of view. The measurements are made on a sample measuring about 2 inches by 1.5 inches. The difference between 15 adjacent peaks and valleys are measured and averaged to provide the texture value for the surface. A 10× eyepiece and a 10× objective (numerical aperture=0.30) is used for samples having more than about 150 peaks per square inch, and a 10× eyepiece and 5× objective (numerical aperture=0.15) is used for samples having less than about 150 peaks per square inch. A suitable microscope which has an readout indicating the difference in elevation between two focus settings is a Zeis Axioplan Transmitted Light Microscope with a Microcode II Accessory. The Microcode accessory records the range of focus settings in millimeters, which can then be converted to mils.

For instance, where the sample includes the wet formed domes **184** and network **183**, the microscope focus would be varied to bring into focus the top of a dome **184**. The microscope focus would then be varied to bring into focus the surface of an adjacent portion of the network **183**. The difference in elevation for the dome and adjacent network would be recorded. This process would be repeated to provide 15 dome/network elevation differences. The 15 elevation differences are then averaged to provide the texture value of the surface. The difference in elevation between a dome and adjacent network surface is represented as E in FIG. **5**.

Caliper

The caliper of a single or multiple ply sample is a measurement of thickness under a prescribed loading. The caliper of a ply is measured using the following procedure: A dial indicator is used to measure the thickness of the sample under a compressive loading of 95 grams per square inch provided by a foot having a 2 inch diameter. The caliper is reported as the average of at least 8 such measurements.

Basis Weight

The basis weight is a measure of the weight per unit area of a sample. The basis weight of a sample is measured using the following procedure. A total of eight plies of 4 inch by 4 inch squares of the sample are weighed, to provide a weight per 128 square inches of the substrate (4×4×8). This weight per 128 square inches is then converted to units of pounds per 3000 square feet. The basis weight is reported as an average of 4 such measurements.

Macro-Density

The macro-density is the basis weight of a sample divided by its caliper.

What is claimed:

1. A heterogeneous multiple ply tissue paper product having n plies joined together, wherein n is an integer greater than or equal to 2, the multiple ply tissue product comprising at least:

a first ply having a texture value of a non-embossed portion of the first ply; and

a second ply having a texture value of a non-embossed portion of the second ply which is at least 1.5 times the texture value of the first ply.

2. The multiple ply tissue paper product of claim **1** wherein the texture value of the second ply is at least 2.0 times the texture value of the first ply.

3. The multiple ply tissue paper product of claim **2** wherein the texture value of the second ply is at least 2.5 times the texture value of the first ply.

4. The multiple ply tissue paper product of claim **3** wherein the texture value of the second ply is at least 4.0 times the texture value of the first ply.

5. The multiple ply tissue paper product of claim **1** wherein the non-embossed portion of the first ply has a caliper, and wherein the non-embossed portion of the second ply has a caliper which is at least 1.25 times the caliper of the first ply.

6. The multiple ply tissue paper product of claim **5** wherein the caliper of the second ply is at least 1.5 times the caliper of the first ply.

7. The multiple ply tissue paper product of claim **6** wherein the caliper of the second ply is at least 2.0 times the caliper of the first ply.

8. The multiple ply tissue paper product of claim **1** wherein:

each of the n plies has an associated homogenous n ply absorbent capacity;

wherein at least one of the n plies has a homogenous n ply absorbent capacity greater than the homogenous n ply absorbent capacity of at least one of the other plies; and

wherein the heterogeneous multiple ply tissue paper product has an absorbent capacity greater than the average of the homogeneous n ply absorbent capacities of the n plies.

9. The multiple ply tissue paper product of claim **8** wherein the multiple ply tissue paper product has an absorbent capacity greater than the maximum homogenous n ply absorbent capacity of the n plies.

10. The multiple ply tissue paper product of claim **9** wherein each of the n plies has an associate homogenous n ply absorbent rate, and wherein the multiple ply tissue paper product has an absorbent rate greater than the average of the homogenous n ply absorbent rates of the n plies.

11. The multiple ply tissue paper product of claim **1** wherein at least one of the plies has a macro-density which is at least 1.5 times the macro-density of one of the other plies.

12. The multiple ply tissue paper product of claim **11** wherein at least one of the plies has a macro-density of at least 2.5 times the macro-density of one of the other plies.

13. The multiple ply tissue product of claim **1**, wherein at least one of the plies comprises a paper web having regions of different density.

14. The multiple ply tissue product of claim **13** wherein at least one of the plies comprises a paper web having discrete regions of relatively high density dispersed throughout one or more relatively low density regions.

15. The multiple ply tissue paper product of claim **13** wherein at least one of the plies comprises a paper web having a continuous network region having a relatively high density; and a plurality of discrete regions dispersed throughout the continuous network region, the discrete regions having relatively low densities.

16. The multiple ply tissue paper product of claim **15** wherein both the first and second plies comprise a paper web having a continuous network region having a relatively high density; and a plurality of discrete regions dispersed throughout the continous network region, the discrete regions having relatively low densities.

17. The multiple ply tissue paper product of claim **16** wherein the first ply has X discrete, relatively low density regions per square inch dispersed throughout its respective continuous, relatively high density network region, the value of X being at least 100; and wherein the second ply has Y discrete, relatively low density regions per square inch dispersed throughout its respective relatively high density, continuous network region, the value of Y being less than 250; and wherein the ratio of X to Y is at least 2.0.

18. The multiple ply tissue product of claim **1** wherein the first ply has a surface having a texture value of less than 10 mils and the second ply has a surface having a texture value of at least 15 mils.

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